Supplemental material for Schlup and Blanquart, Reproducing curvature effects due to differential diffusion in tabulated chemistry, Proc. Combust. Inst. 37, 2019

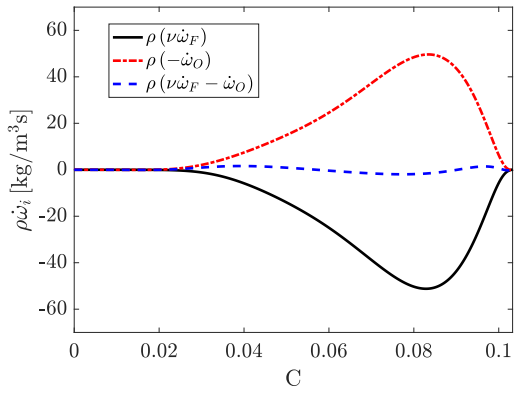
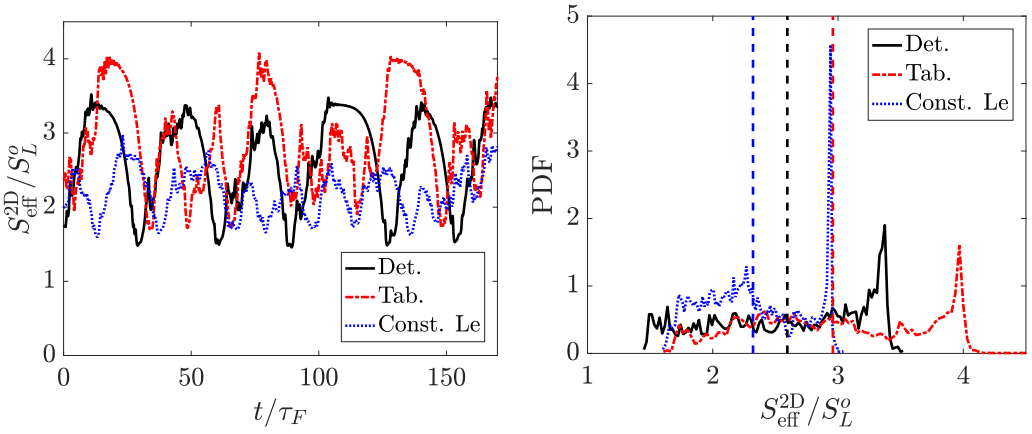


Figure 1: Magnitudes of the chemical source terms for the fuel (solid black), oxidizer (dot-dashed red), and the one-step chemistry approximation (dashed blue) as functions of C for a one-dimensional solution of H_2–air at $\phi = 0.4$.

References

[1] J. Regele, E. Knudsen, H. Pitsch, G. Blanquart, Combust. Flame 160 (2013) 240–250.



(a) Flame speed history (b) PDF of flame speed

Figure 2: Flame speed history (left) and PDF of normalized flame speed (right) for two-dimensional freely propagating detailed chemistry (solid black), tabulated chemistry with thermal diffusion (dot-dashed red), and tabulated chemistry assuming constant Lewis numbers [1] (dotted blue). The vertical dashed lines represent the temporal mean of the corresponding flame speeds.

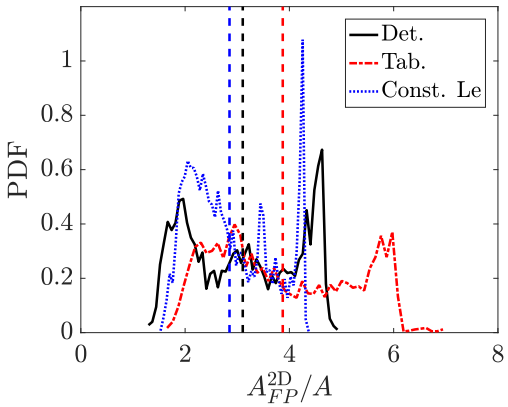
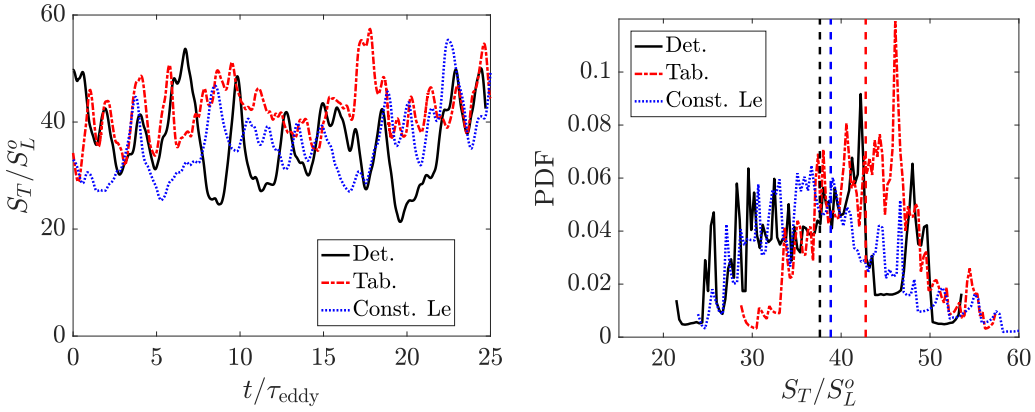


Figure 3: PDF of flame surface area normalized by domain cross-sectional area for two-dimensional freely propagating detailed chemistry (solid black), tabulated chemistry with thermal diffusion (dot-dashed red), and tabulated chemistry assuming constant Lewis numbers [1] (dotted blue). The vertical dashed lines on the left figure represent the temporal mean of the flame area.



(a) Flame speed history (b) PDF of flame speed

Figure 4: Flame speed history (left) and PDF of normalized flame speed (right) for three-dimensional turbulent detailed chemistry (solid black), tabulated chemistry with thermal diffusion (dot-dashed red), and tabulated chemistry assuming constant Lewis numbers [1] (dotted blue). The dashed lines represent the temporal mean of the flame speeds.

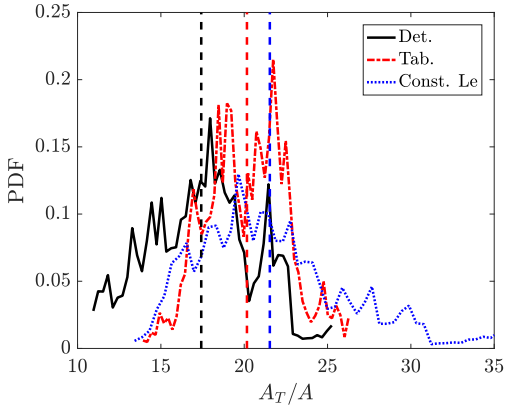


Figure 5: PDF of flame surface area normalized by domain cross-sectional area for three-dimensional turbulent detailed chemistry (solid black), tabulated chemistry with thermal diffusion (dot-dashed red), and tabulated chemistry assuming constant Lewis numbers [1] (dotted blue). The vertical dashed lines on the left figure represent the temporal mean of the flame area.